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We often hear it said by outsiders, and students too, that the students in the College of Agriculture have a poor standing among the other students of the University. But we, who are on the inside, and in a position to understand such matters, know this to be not the case. There is, to be sure, among the narrow-minded a slight tendency to think a little light of those taking a college course in farming, but when these same students are placed in the same college classes with the members of the College of Agriculture the fact is brought out strongly that the farmer students, taken as a class, stand exceedingly well among their fellow classmates. Nor is this all. In college politics, athletics and general college organizations the College of Agriculture and Domestic Science has a very good representation, and it remains to be proved that this class of students do not do their share in supporting all worthy college enterprises. And it also remains for those who say that the "farmer students" do not have a creditable standing in the college at large to set forth the facts which will prove their statement to be true.

The work of the members of Townshend Literary Society still continues to be of a high order of merit. That Townshend has gained a standing upon a level with the other societies of the University is shown by the place which her representative took in the recent oratorical contest. Mr. Loomis is to be congratulated upon the good showing which he made at that time, for although he did not win the contest, it is no small honor to come in second at such a time.

Mr. Pryor was the only contestant who had had much experience in oratorical work before the contest, and, of course, his experience stood him well in hand. But for the benefit of Townshend's representative we cannot but remark that it was no dishonor to be bested in that contest by the piece of polished eloquence which received first place.

Townshend Officers.

At the first meeting of this term the following officers were elected: President, Homer C. Price; Vice President, Flickenger; Secretary, Fippen; Treasurer, Davis; Critic, Britton; Sergeant-at-Arms, Uncapher; Historian, Shellabarger; Librarian, Brown.

Athletic Committee — Thompson, Darling, Stewart.

Executive Committee — Duncan, Goddard, Ditto.

We are in receipt of the following card:

"J. M. Phillips and Miss Ella Fullmer were married at Ayersville, Ohio, on Wednesday, December 16, 1896, Rev. A. E. Delaney officiating."

Mr. Phillips is an old O. S. U. student, having been in the Agricultural course not long since. We express the sentiments of all his old friends in wishing the couple a very happy wedded life.

Gone from the Ranks of Single Blessedness.

From the Ranks of Single Blessedness.

Upon the evening of December 15, 1896, at the home of the bride's parents

in East Columbus, Professor William R. Lazenby and Miss Aiken were married. The wedding was witnessed only by the most intimate friends of Mr. and Mrs. Lazenby. Shortly after the ceremony was performed the happy couple left the city for New York, where they spent the holidays. We all join heartily in wishing the newly-wedded couple a life of much happiness.

Floriculture for the Window and Lawn.

1. Care of plants and bulbs during winter:

We always feel loth to see the many bright flowers perish with the coming of frost and usually crowd our windows with the most promising plants only to have them pass through the winter as skeletons of the original, and unless we have some kind of pit or green house it is better to make cuttings early in September. Starting them in a box of sand, they can be grown over winter quite vigorously, making better plants and yet not taking up so much room.

Great care must be taken in watering, for the yellow, sickly foliage of house plants is oftener due to careless watering than want of sunlight; more moisture in the air and less at the roots is the best advice, and during cloudy weather watering may not be necessary for two weeks.

Poor drainage in pots helps do the mischief, started by overwatering, and a few pieces of broken stone or crock placed in the pot before putting in the soil will obviate this.

Overfeeding does not make a plant grow but tends to sicken it. Have your soil well enriched at the beginning and no further fertilizing will be necessary until spring planting time; compact soda and some good fertilizer and then add a little clean sand at potting time; yet each plant requires a specific soil, for instance, roses and palms need a heavy clay soil, geraniums a sandy loam, and ferns or some begonias a light loose soil. Angle worms often do great damage by being in soil and working around the roots of plants.

Bulbs that have been planted and set in cool place to root may now be brought into warmth a few at a time and they will bloom in a short time. Outdoor or bedded bulbs should now, if not already, be covered with a light mulch to protect them from the severe cold of midwinter.

Remember that your plants are sensitive to the treatment you give them and will repay you as you place means at their dispposal. W. R. BEATTY.

Irrigation.

Irrigation as a means of supplying water to growing crops has been practiced since the days of prehistoric times. The earliest writer on agricultural topics, Heriod, a Greek author who lived about 1000 years before the Christian era, often referred to irrigation as practiced by the Chinese ages prior to his time. In Plato's Timeans is an account which he obtained from his ancestor, Solon, who lived about 2500 years ago. This account states that 10,000 years before the time of Solon there was a large island in the Atlantic ocean opposite the Pillar of Hercules, and that on this island was a very extensive system of irrigation, which used every natural stream and completely surrounded the island. If this record be true irrigation was practiced fully 12,500 years ago.

Twenty-seven hundred years before the Star of Bethlehem began to shine Menes turned the course of the Nile so as to carry the turbid waters out over the higher ground. The first artificial lake of reliable recorl, Lake Moerir, was built for the purpose of irrigation, for the benefit of mankind. It was about 413 miles in circumference and 300 feet deep.

By the time of Moses irrigation had made great progress. This is spoken of in the book of Deuteronomy. In the book of Ecclesiastes we are told of the hidden springs and fountains of Solo-

mon, the water of which was piped to the plains below.

To accomplish irrigation in some of these ancient fields, aqueducts had to be hewn by hand chisels through large beds of solid granite. Some of these channels may be found at the present day. At Patara is a masonry aqueduct crossing a ravine 200 feet wide and 250 deep.

Julius Caesar in his effort to conquer the world carried the irrigation idea into Great Britain.

The Grecians were an inventive people and to them we are indebted for great improvements along this line.

The plan of irrigation is very simple in most cases. It consists simply of a canal which taps a river or lake. This canal conducts the water to the place desired, where it is distributed by smaller canals to the immediate land. This is done generally by a tympanum wheel, which is run by the same stream that supplies the canal.

The extent of irrigation is almost inconceivable. From the very beginning it has been extensively practiced. The Imperial canal of China is one of the greatest constructions for irrigation purposes. It is 650 miles long, connecting the Hoang-Ho and Yang-tse-Kiang rivers. This canal irrigates an immense area of country. The Assyrians, by means of irrigation, converted the unproductive valleys of Euphrates and Tigris into a typical garden. The Nahrawn canal, taken from the Tigris river, was over 400 miles long and from 250 to 400 feet wide, irrigating a very extensive area of country. Rome was supplied with no fewer than nine conduits, which delivered an average of 173,000,000 gallons of water daily.

Coming down to the arid regions: making productive that which was once barren; causing the desert to blossom as the rose and overcoming the parching winds that traverse them; insures the best of crops every season; increases the fertility of soil instead of wearing it out: creates wealth from water, sunshine and soil; makes the farmer independent of the rain fall; brings into cultivation 100,000,000 acres of land in the United States alone; gives support to 50,000 increased population in America; employs more than $1,000,000,000 of capital; insures two crops annually in low latitudes; keeps away the early frosts; makes a more perfect growth of fruit or vegetables; makes farming profitable in waste land; increases the value of land; yields large returns to inventors; drives away all fear of drought and finally makes overpopulation almost impossible so far as being supported by our overproduction is concerned.

J. T DALLAS.

The Ohio Academy of Science.

At an annual meeting of the Biological Club of the Ohio State University held November 3, 1891, the president of that organization gave an annual address in which the following language was used:

"There is need of one organization toward which our club should direct its combined energy and influence. I refer to a State Academy of Science. If local scientific clubs and societies are beneficial, the reasons that make them so apply with greater force to a State Scientific Society. Who can estimate the inspiration, the stimulus to original research and investigation which such an organization would provoke? In a great agricultural State like Ohio, a deep, abiding and constantly growing interest will ever be taken in the science of geology, botany and chemistry; for these constitute the very foundation, the rational basis of all practical knowledge regarding soils and the various crops that grow thereon. But our State academy would not be confined to these. All branches of biology, as well as physics, anthropology, pharmacy, applied mathematics, sociology, etc.; everything that contributes to the sum total of scientific knowledge would find a place."

At this same meeting of the Biological Club, Professors D. S. Kellicott, W. A. Kellerman and William R. Lazenby were appointed a committee, with instructions to effect, if possible, an organi-

zation of the scientists of the State. This committee issued a call for a meeting to be held at Columbus, December 31, 1891, at which time and place the Ohio Academy of Science was organized. Since organization the Academy has held a summer meeting and an annual meeting each year. Summer meetings have been held at Akron, Logan, Granville, Sandusky and Oxford. The time occupied by these meetings is spent to a large extent in field work. Excursions are made to historical and interesting points in the vicinity, and usually much of interest to scientists is procured. The annual meetings have been held the last week in December each year, and, with one exception, in Columbus. The annual meeting of '95 was held in Cincinnati, but hereafter it is probable the Academy will consider the Ohio State University its home and permanent meeting place. These meetings have always been interesting, instructive and well attended, and it can be said with truthfulness that the session just closed has surpassed all previous ones in the interest manifested by members and friends. Forty-eight papers were given on a great variety of subjects, and the president, Prof. Albert A. Wright, of Oberlin, delivered a well-prepared annual address, entitled "A Topographical Survey of Ohio." On Tuesday evening President Canfield gave an address of welcome, in which he extended to the members of the Ohio Academy of Science a most cordial greeting in behalf of the University. During the business meetings of the session a committee was appointed to draft resolutions in opposition to the anti-vivisection bill now pending in the Senate, having already passed the House of Representatives. Some time was also spent in discussing the publications previously sent out by the Academy and suggestions were offered for improving the annual report, so that instead of the fifty-page pamphlet of former years, a volume of three times that many pages will probably be issued under the title of the Fifth Annual Report.

Nearly twenty names were added to the membership of the organization during the entire session.

In the election of officers for the ensuing year Prof. W. A. Kellerman, of the State University, was chosen president; Dr. C. E. Slocum, Defiance, and Prof. J. B. Wright, of Wilmington, vice-presidents; Prof. E. L. Moseley, Sandusky, secretary; Prof. D. S. Kellicott, State University, treasurer; Prof. W. M. Hill, East Liverpool, and Prof. L. H. McFadden, Westerville, members of the executive committee, and Prof. E. L. Moseley, committee on publication.

Up to the present time no site has been chosen for the summer meeting, which will convene in the early part of June in some section of the State favorable for general collecting.

Agricultural Education.

Among the questions that are always put to an agricultural student when he informs his friends that he is pursuing a course in agriculture are the following: What good will a course in agriculture do you? Can't you farm without being a graduate of a university? What is there to study about farming? Haven't we farmers already got along without a college education? Do you really expect to come back to the farm after you have completed your course? Why don't you study something by which you can make more money when you are through; as law, medicine or a business course?

It seems to puzzle most of us to know what to say when someone asks us what good we expect to get out of an agricultural course. Why should the question puzzle us? Is it because we are doubtful ourselves of its value to us? No; it is not that. It is because the answer to the question includes so much that we do not know what to say first. If the question was more pointed and would ask what we expected to learn about soils, fertilizers, crops and their cultivation, stock and their care, etc., we would not hesitate long in answering it.

By logical comparison the question may be briefly answered as follows: The agricultural college is to the farmer what the law school is to the lawyer or the medical college is to the physician. Our laboratories and field observations are as valuable to scientific farmers as mock trials and police courts are to lawyers or clinics and hospitals are to physicians.

To speak more in detail of the benefits of an agricultural education, I will discuss the subject under the heads of finance and usefulness.

First, an agricultural education pays financially. How strange it is that when a young man seeks his future occupation almost invariably he considers only the financial phase of the matter—how he may make a fortune in the shortest possible time with as little labor as possible. He forgets to ask himself how useful he may make himself to the world, how he will enjoy his work, or what influence he may exert on his fellow-creatures. Of course, it would be very unwise to not consider the financial side of an occupation; but we should not let that be the only object of our consideration. There are many ways in which an agricultural education will aid the farmer financially. An educated farmer, knowing the laws of mechanics, will save much money by being enabled to select the very best implements for his use; let them be shovels, plows or binders; milk-testers, churns or cream separators.

He will be able to decide which are built of good material or constructed on true mechanical principles and which will give him the longest and best service.

His acquaintance with the experiment stations, their method of work and the results of their experiments will be of great value to him. He will learn of them the best methods of cultivation, and in the agricultural college he will have learned the reason why one method of cultivation is, better than another. True it is that any farmer may derive much benefit from experiment station bulletins; but it is also just as true that many farmers would scoff at the idea of reading such bulletins, while the educated man will appreciate their value and be profited by them.

The dairyman or general farmer, unless he has had many years of experience, is easily handicapped by the college-trained man in selecting the choice animals. Through close observation and strict attention to teachings the student learns to know where to look for the good or bad points of an animal, and he thus in a short time acquires a skill in judgment which only years of experience could have taught him without this education.

Many hundreds of dollars are unwisely spent each year for fertilizers. The farmer is persuaded to believe that his soil needs a complete fertilizer and will spend $30 a ton for it. As we are taught in chemistry that no two fields are likely to need exactly the same fertilizer, how much less likely is one fertilizer apt to supply the needs of a whole township, unless it is a complete fertilizer? But complete fertilizers are costly and very few farms are so deficient in the elements of plant growth as to need a complete fertilizer. One farm may need only phosphoric acid, while another may be deficient in ammonia. To apply a complete fertilizer to either of these soils would, of course, better the crops; but so would the single fertilizer do the same thing and it would do it at a very reduced cost. The scientific agriculturalist has learned this; but the uneducated man has not. Surely education along this line would help most farmers financially.

We might thus enumerate hundreds of cases where an agricultural education would help the farmer to success.

In the second place, an agricultural education pays in usefulness. Success in life does not mean the mere hoarding of money and property. That is only a one-sided success—that of finance. A miser or dishonest dealer may amass a fortune, but would you call them successful men? A successful man is he who not only helps himself, but also makes himself as useful as possible to his co-

workers. Farmers are always willing to assist each other, but the man that is educated can be the most useful to his neighbor. He not only is willing to adopt the best ways of the neighborhood, but he is always alert in experimenting and in urging improvements. He does not wait for some other community to lead in some new work, but by his greater knowledge he is able to grasp and originate new ideas and then put them to use.

Such men will be the leaders in urging the instruction of elementary agriculture in our common schools. Is not this a great necessity? What is there in our whole school system to induce the boys and girls of our country to desire a higher agricultural education? Not one branch has a tendency to create a love for the farm. Is there any reason for wondering why so many country youths seek some other profession when they are, as it were, taught away from the farm?

M. R. SHELLABARGER.

Facts and Figures from the Dairy Records.

An examination of the O. S. U. dairy records for the year of 1896 brings to light some interesting facts and figures. The following is a summary of the receipts and expenditures for the year:

Pounds milk produced	163,428
Receipts for milk	$3363 11
Cost of labor	$1326 36
Cost of feed	788 26
Total expenses	$2114 62
Net income	$1248 49

There was an average of 27 cows actually in milk throughout the year, but as cows were being bought and sold from time to time, not the same 27 cows were in the herd throughout the year. The income from each cow actually in milk was $124.57. The expenses were $78.32, leaving a net income of $46.25 per cow.

From the above summary it will be seen that each cow averaged about 6053 pounds of milk for the year, or about 16 1-3 pounds per day. The average cost of feed per cow was $29.19. (This does not include pasturage. The herd was on clover pasture for about two months during the latter part of the summer and fall. The remainder of the warm weather they ran in a ten-acre lot where the pasture was very short.) The average cost of labor per cow was about $49.23. (This sum, however, includes the cost of care of dry cows, bulls and calves, but the cost of feed relates only to the cows in milk.) This makes an average cost of $78.32 per cow.

Assuming that a gallon of milk weighs 8.6 pounds, on this basis it required 4.2 cents' worth of feed to produce one gallon of milk, while the cost of labor per gallon was 8.6 cents, making a total of 12.8 cents per gallon. The average price received per gallon was about 19 cents.

Of course, the 163,428 pounds—which was the amount actually produced—was not all retailed.

A considerable quantity of it was fed to calves and disposed of in various other ways. But the average price received per gallon was computed on what was actually sold. The actual cost of furnishing a gallon of milk to the consumer is, however, a little more than 12.8 cents, because there is a certain amount of waste in over measure, and the milk will run short; that is, it will require more than 8.6 pounds of milk to measure a gallon in retailing from the wagon. It will be seen from the above figures that the dairy is self-supporting. It is a fact worthy of notice that the whole sum ($1326.36) which was paid for dairy labor was paid to students. Seven men find regular employment on the dairy, while there is more or less work done by other students at odd times. The training which the boys receive who work on the different departments of the farm is of considerable practical value.

Hoof Nurture.

Although ordinarily the terms "foot" and "hoof" as applied to the horse are confused, technically speaking, the foot is the lower portion of the leg and in-

cludes the lower end of the shin-bone, the fetlock joint, the pastern bone and those bones, ligaments, tendons, blood vessels, nerves, etc., encased by a horny box at the most distal part of the limb. This horny box or shell, analagous to the fingernail in man, is called the hoof. The hoof is separable into three distinct parts—First, the wall, which is that portion forming the front and sides of the shell, to be reflected forwardly and inwardly at the heels as two strengthening rods of horn appearing upon the volar surface of the hoof. This reflection of the wall is known as the bars. The wall of the hoof, unlike the upper of the shoe of man, to which it is commonly compared, comes in contact with the ground. The sole is the floor of the hoof and is wedged in between the walls and bars, having behind a V-shaped excission to receive their portion or frog. The frog is a pyramidal-shaped mass of soft, elastic horn, its apex directed forward into the angle formed by the bars which separate it from the sole. Its base becomes lost behind in what are known as the balls of the foot. The hoof-horn is secreted by the continuation of the skin of the body, under the shell, which covers the underlying tendons, bones, etc., like the sock on the human foot. Horn is simply modified hair. 'Though to the casual observer the hoof may appear a simple piece of anatomy, if we study carefully its parts as to position, physiological action and mechanism, we will find it to be one of the most complex, but most beautifully arranged apparatus of the whole animal body. "The hoof is one of the Creator's masterpieces" has been exclaimed. To treat of its varied parts and their relationship to one another would require too much space and lead far beyond the purpose of this article.

Situated as the hoof is, it must necessarily be exposed to all kinds of mechanical and chemical insults, such as the effect of concussion, heat, cold, mud, etc., from the roadways and the action of fermenting urine and excrements from uncleanly stables. Horn, however, is strong and elastic and a poor transmitter of heat and cold; otherwise the hoof's functions would soon become so impaired as to make the animal of which it forms a part unfit for service. At best, about 90 per cent. of the lamenesses of the horse find their seat in the hoof, and as nearly one-half of all our horses after five years' usage become crippled through lameness, reducing not only their commercial value, but rendering them objects worthy of the pity of humanity, it must seem that the care of the hoofs ranks only secondary in importance to proper feeding and stabling.

The care of the hoof should begin with the foal. It is best to allow the colt abundant exercise upon dry, but not strong ground. The hoofs then are worn off naturally and usually evenly. In case there should be any irregularities in the wearing off process a few well-directed raspings with a blacksmith's file will set all aright. If colts are kept up in stables, however, as is the case in winters in the North, the wall-horn, which is constantly being produced from above, does not become worn away and there result changes in the hoof's form. The wall becomes too long (high), distorted, or the layers of horn of which it is made up become separated, inducing a condition known as "hollow-wall." The wall at the quarters (toward heels) becomes bent around under the hoof and over the sole, encroaching upon the space of the frog, leading to an anomaly that we call "hoof-bound." Then the toe of the hoof grows out too long, causing the pastern bone to stand too perpendicularly and the gait to be unsteady and stiff. The colt "walks as if treading upon eggs," we say. To prevent these abnormalities, the hoofs should be shortened from time to time with a hoof-knife and the wall, which has become bent around over the the sole, pared away. The outer edges of the wall, coming in contact with the ground, should be rounded off carefully to prevent a splitting or slivering of the horn.

Some hoofs have a tendency to grow crooked, especially in young colts. We

can do much toward straightening these distorted feet by paring and rasping them until they assume the normal form. We must always bear in mind, however, the attitude of the legs, i. e., the leg When paring the hoofs, for instance, it direction with reference to the body. would not be well to try and make the outer and inner sides of the wall of equal length (height) in a colt or horse whose legs assumed a "knock-kneed" or "spray-footed" attitude, for, naturally, in this case, the inside wall is lower than the outer. In very young animals even irregularly-shaped legs can in a great measure be adjusted by judiciously paring and rasping the hoofs. Next to keeping the hoof in its correct form comes moisture and cleanliness, as essential to its proper nurture. Frequently washing the hoofs in clean water and allowing plenty of good straw bedding will usually supply these requirements. Shoeing colts too young interferes greatly with the growth of the hoofs. It prevents the natural expansion and contraction of the horny shell, impairing the free circulation of the blood through the horn-producing tissue underneath. Young shod colts, too, are often overdriven and prematurely ruined. Light farm work can do a colt no harm, and for such work shoeing is not necessary.

The shod hoof of the adult horse requires even more care than that of the bare-footed colt. Shoeing at best is an evil, but to protect the hoof from abnormally wearing off upon hard, stony streets, it must be resorted to. By nailing a ridged piece of iron or steel to the shell the hoofs' mechanism—the expansion and contraction the horn undergoes by the horse's treading upon the ground and raising the foot again—is interfered with, the free circulation of the blood is slackened, the growth of horn diminished, and, consequently, in time, every shod hoof becomes atrophied (shrunk). Added to this, the keeping of the animal tied in a stall, allowing insufficient exercise; uncleanliness, bad bedding and not enough moisture all tend to augment this detrimental influence. In horses kept much of the time in stables, especially the front hoofs must suffer. The hind ones are dampened by the excrements and urine. An uneven flooring of the stall exhausts the limbs and fermenting droppings among the straw bedding leads to the development, most commonly in the hind hoofs, of a disease called "thrush."

The principal indications in caring for the shod hoof are to ameliorate as much as possible the bad effects of the shoeing and the keeping of the horse standing in tie-stalls in the stable. In the first place, much can be done by having the shoes removed every four or six weeks and the hoof shortened and properly pared into correct form. The popular belief so prevalent among horse-shoers to have "plenty of foot (horn) under the horse" is a grave error. In race horses, where everything is sacrificed to gain speed, there may be arguments in favor of allowing the hoofs to grow out to an abnormal length to gain distance at each stride. Such a procedure must, however, in time, lead to diseases of the foot, i. e., tendons and joints. Secondly, moisture and cleanliness: These can be supplied, as has been shown, by allowing plenty of dry straw and daily clearing out the hoofs with a "foot hook" and washing with water. This will prevent thrush in the hind hoofs and will permit the front ones to absorb enough moisture to make them elastic. Moisture is very essential to the mechanism respectively to the development of the bone constantly being formed.

To prevent the evaporation of the water from the bone, a smearing of the hoof with fat is beneficial. This is especially of advantage when the hoofs are not washed daily. One needs to use only a small quantity of fat, which can be applied with a rag over the upper part of the wall (near the hair) and over the frog and sole. It requires no specific formula nor patent hoof ointment. Pure lard, lanoline or good vaseline suffice.

Glycerine should never be applied to the hoof, as it tends to dry it out. Salves should never be put on a dirty hoof; their application must always be preceded by washing. The reason for this is that the dirt and fat together form a crust, under which the horn crumbles away. No ointment can directly stimulate the growth of horn, though some may contend to the contrary. In very wet weather or where the streets are covered with snow or slush, the addition of a little turpentine or wax to the lard is desirable, as it prevents the horn from becoming too soft.

When the hoof is properly treated by washing with water and smearing with fat in the manner indicated, the natural color and tubular structure of the horn is everywhere seen. Finally, moderate exercise is required by the hoof. This furthers the circulation of the blood within the horn-secreting tissue and hence the production of a better quality and quantity of horn. Horses that work, therefore, have usually better hoofs than those which stand most of the time idly in their stalls.

Inasmuch as shoes are injurious to the growth and development of the hoof-horn, it is indicated to remove them whenever the horse is laid off from work for any length of time. Of course, it is understood in this case that the hoof's condition will permit of it.

DR. D. S. WHITE.

Notes on the Occurrence of Dragonflies in Ohio in 1896.

By Prof D S. Kellicott.

At the close of the collecting season of 1895 I prepared and published a chart showing at a glance what was then known about the distribution and time of flight of each of the eighty-six species of Odonata known to inhabit Ohio. This was done after collecting had been done in every quarter of the State and at all seasons. It was believed the record, so far as it went, was reliable. Some species had been found only in limited areas and at definite times in the year. The schedule showed what species occurred in early, mid and late summer, and in northern, central or southern Ohio. But with the opening and progress of the present season my confidence in the chart referred to has been severely tested. How did it happen? We naturally turn to the climate and its vicissitudes for the explanation of many things—trivial and grave. Will it help us in the matter in hand?

The seasons of 1894 and 1895 were very dry throughout the State. Streams and ponds lost all their water and the mud at the bottom was dry and parched for months over large areas. Streams of considerable volume in ordinary years disappeared entirely for weeks or there remained only restricted pools here and there. The winter of 1895-6 was constant for Ohio with less than the average snowfall. The weather remained cold until April 10, when it suddenly became very warm and remained so with abundant rain. What resulted as to the appearance or non-appearance of dragonflies? The following notes will state some of the observed facts. First—Many species occurred unusually early. The largest number recorded in April at Columbus in any previous year was five; this year it was ten. They were taken in the following order: Anax junius, April 13; Ischuura verticolis April 15; Didymops transversa Basiaeschna janata. Anomalayrion hastatum, Lestes forcipata, Tramae Carolina, Plathemis trimaculata, Libellula semi-fasciata and Nehalennia posita. The variety is not less interesting than the number. Among them are some of our largest species and the smallest; while four families are represented. Five have been taken in April in previous years, although not in the same year. Anax, Ischuura, Didymops, Basiaeschna and Tramea have been taken as early in former years, the first two much earlier, but the remaining forms not until May was well advanced or till midsummer. From this a general statement may be made that five of the

ten earliest species appeared no earlier than usual, but appeared suddenly, i. e., after a very few warm days, while five appeared from two to four weeks earlier than ever before noticed. I may extend this record of early occurrence by saying that thirty-five species were taken before the end of May and that several of them were those not before seen on the wing until midsummer..

In this connection let me say that species common to Ohio and the Atlantic coast appear to emerge fully two weeks earlier in the interior than on the coast at the same latitude. Nor is it a matter of isotherms alone, as a glance at an isothemeral map and the recorded captures at Philadelphia and New York will show. It is, I suspect, due rather to distribution of heat and affects only early appearing species.

Second—It is an interesting question, one often asked, but not answered, whether the existing species are fewer than when the country was more primitive. The diminution of streams, ponds and morasses, as well as the pollution of streams, have been taken to be sufficient causes for their reduction. The unusual conditions of 1894 and '95 naturally lead us to inquire if any light has been shed on the question. What, then, have been the observed results? So far as my observations have gone, and I have been much in the field, there is no evidence in the line expected. Odonata in the region included in these notes have been unusually abundant during the summer of 1896. No species hitherto taken in any abundance has been missed, while several not before taken at all have been abundant. This was unlooked for. Possibly my records indicate this, that the unusual abundance in early spring and summer was in the vicinity of perennial waters and that about the transient ones they were fewer than the normal number; it is certain that all of the six or seven additional species taken were found in the vicinity of such streams and ponds.

The consideration of the foregoing facts and the conditions which seem to have influenced them leads to a possible clue to the causes. Life of all kinds, plant and animal, in the restricted and concentrated waters of the dry seasons, were excessively abundant. The predacious odonate larvae, so long as any moisture remained, would be in clover; but when the water entirely disappeared, what?

Unfortunately, there are no records at hand in regard to their ability to remain in the mud or within capsules of earth at the bottom of dried-up ponds. Other animals and some larvae are known to do so. Why not also the larvae of odonatis? If this fact was proven it would easily explain the unusual abundance of dragonflies this present season in place of an anticipated dearth. Again, the eggs of some species, certain species of Diplax for example, do not hatch immediately, and, therefore, may remain in the dust or mud until the autumn rains or until spring. In this connection I may state that Diplax rubicundula and D. obtrusa have been seen industriously ovipositing among the grass and weeds overgrowing dry ponds and ditches. Eggs thus scattered would certainly have to remain without immersion among dust and rubbish, in some instances, for weeks. The female of Lestes rectangularis has been seen ovipositing in stems of Scirpus and Sparganium where no water remained in the marsh and surely did not return for a month. It would appear from these incomplete observations that the nymphs of odonatis may and probably do readily pass the trying times of drouth unharmed.

Third—Records made this summer have confirmed conclusions of former years that Southern forms extend their range on the western border of Ohio to Lake Erie. I may cite as examples Dromogomphus spoliatus, which, until taken by me at Toledo, was recorded only from the extreme South. I do not remember to have seen it in any private or public collections. This year along the Maumee river it was exceedingly abundant. Another example is that of

Macromia taemolata, which has been taken along the Maumee river by Mr. James S. Hine and myself. Allow me to mention two more examples of the same sort and I will relieve you. Gomphus intricatus, recorded in the lists only from Texas, has been taken by Mr. Hine at Napoleon, Ohio, while G. externus occurs through Central Ohio.

Recorded from the same locality at first, afterwards in Illinois, by B. D. Walsh, is among the commonest of the Gomphines in Central Ohio. Occurring in June along swift streams.

The following interesting program has been arranged for the meeting of the Agricultural Students' Union, for the evening of Thursday, January 14, 1897.

Preliminary Business — Appointing Committees.

President's Address—Vice-President R. W. Dunlap.

Report of Secretary-Treasurer—C. W. Burkett.

Report of Agricultural Director — L. M. Bloomfield.

Report of Horticultural Director—J. S. Hine.

Address, Co-operation in Experimental Work by Union and Experiment Station — Director Thorne, Wooster, Ohio.

Address, The Union as a Means of Education — D. A Crowner, Wooster, Ohio.

Address, Educated Student on the Farm — Frank Ruhlen, Plain City, Ohio.

Address, The Mission of the Student's Union — F. P. Stump, Convoy, Ohio.

Address, The Expediency of the Union — Professor Lazenby, Columbus, Ohio.

Miscellaneous Business.

Improvements in Laboratory Methods of Teaching Agriculture.

[Read by Title Before the Section on Agriculture and Chemistry of A. A. A. C. & E. S. at the Washington Meeting, November, 1896, by Prof. Thomas F. Hunt.]

The direction which this paper has taken has been somewhat warped by the discussions which have already occurred at this meeting. This paper, however, essays to occupy a much more restricted field. It is a sort of back lot to the magnificent estate which has been presented by a number of gentlemen to this convention.

I wish in the beginning to reaffirm briefly what I stated a year ago, viz.: That students who come to us to study agriculture have been taught to do in greater measure than they have been taught to think. To use President White's expression they are relatively more skilled in handcraft than in readcraft. To make well-rounded men, therefore, we should emphasize with these men readcraft rather than handcraft during the four years they are with us. Increasing experience only serves to more fully convince me that the academic method rather than the university lecture method, or too much laboratory or seminary work is the best policy of instruction—considering the training the students have which come to us—whether the subject is taught by the professor of English, physics, botany or agriculture. I am most heartily in favor of laboratory methods for teaching agriculture, but laboratory work should be kept in the proper proportion for the best pedagogic effect.

Three difficulties in providing laboratory practice in agriculture must have occurred to all workers.

1. The cost and difficulty of maintaining a suitable equipment.

2. The difficulty in having facilities in the proper condition at the proper time.

3. The weather

A number of concrete examples will serve to illustrate these difficulties and possibly suggest some improvement. The subject of farm crops may properly occupy a term's work, but in whatever term it occurs, not all farm crops will be in condition for field study. It will happen often, therefore, that the field study of a certain crop must be injected into work of some other in an apparently illogical manner. If, for example, farm equipment occupies the fall term and farm crops the spring term, it will be desirable to turn aside from the discussion of the former in the fall term, while the studies of the varieties of corn is made.

In the study of the breeds of live stock, the subject of judging is one of the essential features. In order to teach stu-

dents to judge live stock, they must judge them. This means that a fair number of specimens of the various types must be available, either upon the college farm or upon farms which are accessible. Unquestionably laboratory methods in this line of work cannot be brought to perfection until the college has the proper specimens. However interesting it may be for a party of students to travel twenty-five miles to visit a herd of cattle, it is too exhaustive of time and energy and breaks into the schedule of work too seriously to be considered generally desirable. Even if no attempt is made to keep all the breeds, but simply to keep, say six specimens of each of the types of horses, cattle, sheep, swine and poultry, this means a large expenditure of money in the first instance, and in the long run larger expenditure for maintenance. It is not essential or even desirable that these specimens should all be perfect, and there is no danger they will be.

This is far from model farming. In the judgment of the writer the farm laboratory can no more be a model farm than laboratories for manual training can be model commercial foundries or machine shops. And here it should be stated that to maintain a farm laboratory properly must of necessity be more expensive than to maintain an experiment station, from the fact that an experiment station may confine its energies along certain restricted lines, while instruction in agriculture must cover a larger field, even though it may not attempt to cover the whole field.

In view of the papers already presented to this convention it may be well to briefly outline for the benefit of those who do not teach agriculture the steps by which the subject of the breeds of live stock, for example, is presented to the students by the various instructors on this subject in this country. The instructor in animal industry first gives the student one or more lectures on the points to be observed in judging dairy cattle, we will say, and the reasons for taking these points into consideration. This lecture may be, in the absence of proper specimens in the flesh, illustrated by lantern slides. The next step is to take the student to the stable, or, preferably, to bring the cattle to a room properly constructed for this purpose in the agricultural building and here point out what are beauties and what are defects in dairy cattle. This is a demonstration lecture or clinic, but, however valuable this may have been to stop here would be to fail in giving them laboratory practice. The next step is to place score cards in the hands of the students and require them to score the cattle. This is laboratory practice. The next step is the quiz or examination by which the instructor determines how well the student has comprehended or remembered the subject.

The study of the breeds of live stock may in a four years' course leading to the degree of B. S. occupy the attention of the student four or five exercises per week for half a year. Three lectures per week may be devoted to lectures and recitations upon the history, characteristics, adaptation, management and theory of judging of the various breeds and one exercise of two hours may be devoted to the laboratory practice.

If the steps which I have outlined are not as thoroughly pedagogic in form as instruction in botany, physics, chemistry or English, I am unable to understand educational processes. I wish particularly to call attention to the fact that the same instructor, or his assistant, take part in all these steps. The instructor in animal industry or agriculture or whatever else he may be called is not a demonstration assistant to some professor of science. He should be a trained teacher and occupy a sufficient length of time in the class room to thoroughly educate the student in the subject he wishes to present.

However much we may talk about the value of educative processes, we are apt to judge the efficiency of a certain course in botany, chemistry or physics

by observing whether the course makes botanists, chemists or physicists or gives the students a good knowledge of these subjects.

I have in mind a class of thirty young men who recently judged a herd of cattle belonging to the leading showman of that particular breed in that particular State. After the students were through the owner of the cattle said privately that he would sooner risk his cattle in the hands of those students than in the hands of any judge who judged his cattle at the eight county fairs where he showed them this season. Two-thirds of these students had only had two laboratory exercises in judging this type of cattle. The ex-students of the University of Wisconsin judged live stock at thirty-six fairs in that State this season.

There is another study closely allied to the above and that is animal mechanics. Here the student can be taught by means of a text book that horses for certain purposes have certain relative measurements, that the segments of the limb have certain lengths and articulate with one another, in such a manner as to form certain angles. The reason why animals for speed must be essentially different from animals for force can be demonstrated on the blackboard. The next step is to place instruments of precision, and horses of these various types in the hands of the students, and require them to verify or disprove the theories demonstrated on the blackboard. In order to carry on a laboratory exercise to the best advantage with, say fourteen students, we may divide them into pairs which will require seven horses, and of course to work to advantage, seven sets of instruments of precision. One set of such instruments cost us over fifty dollars, and the set is deficient in several particulars. We should, also, have a room where seven horses and fourteen students may dispose themselves in a comfortable manner. Should we have fifty students our difficulties would be increased. We meet another difficulty in the case of our students, and that is, the text book lists at six dollars.

When we take up the subject of soils, we have that admirable text by Professor King, by which the student may be and should be given thorough class room drill. The following demonstrations might be made by the instructor in the class room:

1. Determination of specific gravity of soils.

2. Determination of volume weight of soils.

3. The power of retaining moisture in a soil in its highest degree of looseness.

4. The power of retaining moisture in a soil when compacted.

5. The rate at which air, under given pressure, will pass through soils.

6. The filtrating power of the soil.

7. Capillary attraction in soils.

8. Behavior of soil toward gases.

9. Heat conducting power of the soil.

10. Evaporating power of the soil.

11. Cohesion and adhesion of soils.

12. Mechanical analysis of soils.

No instructor will make these demonstrations if he can introduce the laboratory method. Assuming ten experiments, ten laboratory exercises may be arranged for twenty students, two students performing each experiment jointly. All these experiments must be set up and in operation at the same time, the student being shifted at each exercise until all the experiments are performed. This not only implies apparatus but the room in which to set it up. The pieces of apparatus must grow with the number of students or they must be taught in sections. Each experiment must be so arranged as to occupy about the same time and the allotted time. Otherwise the students get in the way of each other.

To show further some of the difficulties in laboratory practice in agriculture, I will read the actual practicums performed last fall, under the head of farm equipment at the Ohio State University. In this subject two exercises per week

were devoted to lectures and recitation, and one exercise of two hours to the practicums. The practicums were as follows:

September 13—

Class went to the fields and made observations and notes on condition of crops. Explained methods of cultivation that had been applied to each crop. Called attention to difference in appearance of corn on rye stubble ground and on fallow ground. Pointed out probable reason for the difference.

September 20—

Dynamometer tests of draft of disc harrow set at different angles, also of spring tooth harrow, and smoothing harrow with teeth set at various angles. Tests were also made of the draft of the tubular roller with different amounts of weight in the boxes.

September 27—

First—Tests of drafts were made as follows:

First—Wheeled walking plow at 4 inches deep.

Second—Wheeled walking plow at 6 inches deep.

Third—Wheeled walking plow at 8 inches deep.

Fourth—Wheeled walking plow at 10 inches deep.

Fifth—Wheeled walking plow at 6 inches deep, cutter attached.

Sixth—Wheeled walking plow at 8 inches deep, cutter attached.

Seventh—Imperial walking plow at 4 inches deep.

Eighth—Imperial walking plow at 6 inches deep.

Ninth—Imperial walking plow at 8 inches deep.

Tenth—Imperial walking plow at 10 inches deep.

October 2—

Witnessed a trial of Deering and McCormick corn harvesters.

October 4—

Studied twenty-five varieties of corn in the field, making measurements, etc.

October 11—

Studied typical ears from above varieties in the laboratory. Placed them in order of excellence.

October 18—

Examined cattle and horse stables on University farm, making studies of dimensions of stables, different kinds of ties, systems of ventillation, etc.

October 26—

Examination on account of rain.

November 1—

Tests of draft of high Fish wagon loaded with 1500lb, and truck wagon loaded with 1500lb. Each of these wagons was tested on hard dirt road, plowed ground, and wheat stubble ground.

November 8—

Rained.

November 15—

Examination on account of bad weather.

November 22—

Made notes on work of the Keystone Corn Husker and Shredder at the University farm barn.

November 27—

Visited Mrs. Halleck's herd of Jerseys. Made observations on arrangement of stables, ties etc.

November 29—

(Thanksgiving Vacation.) Visited Hill's herd of Red Polled cattle near Delaware, Ohio.

December 6—

Worked with King's model of the horse which shows: Effect on draft of weight of horse, hitch, width of hock, etc.

December 13—

Adjourned to give the class time to work on plans.

In addition to the above work each student was required to hand in three drawings at the close of the term. One plate to show the arrangement of fields, fences, roads, and location of buildings. Another plate to give arrangement of barn-yard and lots, together with location of farm buildings, while still another plate gave detailed first floor plan of each of the farm buildings not including the house.

The drawing of farm plans may fairly be said to be laboratory work. By placing score cards in the hands of the students we make a laboratory exercise of the study of the varieties of corn, but the other exercises were demonstration lectures, and while of some value were very unsatisfactory. For eighteen students on a raw November day to stand around while the instructor demonstrates that a plough with a coulter pulled harder than without one, or the reverse, part of the time peering over each other's shoulders to try to see what is going on and the rest of the time hammering each other with their fists to keep warm, is far short of an ideal method of instruction. If we divide the students into six squads of three each and have six tools or machines of the same or different kind, and six teams, six dynamometers and sufficient instructors to help students over difficult places we might have a thoroughly satisfactory laboratory method, provided it did not happen to rain, or had not rained so recently as to make the work impossible.

Every instructor in agriculture knows that I have not begun to exhaust the difficulties in teaching agriculture. In closing I wish to emphasize that it is a matter of no consequence to this discussion what official title the instructor bears who teaches the lines of work I have indicated. That a subject should be taught only once in a college course goes without saying, but it should be taught by a man who knows the subject in all its ramifications. If the title of professor of agriculture is an embarrassment in the proper distribution of this work, the title should be abolished. In any case, however, the lectures, the demonstration, the laboratory work and the quiz should be under the direction of one man duly qualified for each step in the process. If a subject is not capable of such presentation, it has no place in my judgment in the college course. This is entirely apart from the fact, that there is a proper sequence of subjects, mechanics follow mathematics and physics; horticulture follows botany; agriculture follows chemistry, zoology and physiology.

Experiments With Potatoes.

Thirty-six of the agricultural experiment stations have experimented with Irish potatoes. A summary of results of these experiments will be found in Bulletin 40 of the Illinois station.

Wisconsin, Michigan, Ohio, Indiana, Illinois, Kentucky and Missouri stations, after testing varieties for two to six years, find the most prolific to be Alexander's Prolific, Beauty of Hebron, Burbank, Charter Oak, Dakota Red, Pearl of Savoy and Rural New Yorker No. 2. Southern stations find the Triumph (sometimes called Red Triumph and Tennessee Red Triumph) most prolific and in every way best.

Home-grown seed generally gave slightly better results than seed from abroad, and at southern stations the difference in favor of home-grown seed was marked. Spring planting from fall crop or second crop seed of the previous year has everywhere given far better results than spring seed of the previous year, probably because seed of the fall crop is not exhausted by sprouting during storage.

Three stations have experimented with seed from the best hills and all agree that these improve yield, size and quality.

Twenty stations have tested the merits of one-eye, two-eye, quarter, half and whole seed, with conflicting results. In this matter it has been decided, however, that the larger the seed pieces the earlier the crop, and the richer the land the less difference in yield between large seed and small seed. On poor land the large seed gives much the best results, probably because the plant is nourished by the substance of the seed till it is well established in the soil. To plant large seed whole requires thirty to forty bushels of seed per acre; while for single eye pieces three to four bushels are sufficient. For very early crop, plant

large seed whole; otherwise quarters seem most profitable.

Ten stations have tested the merits of seed-ends, stem-ends, and middle pieces, and the average results show no material difference. Early varieties and early planting give the best results.

Five stations have experimented as to depth of planting, the best results, in most cases, being from a depth of two to three inches.

Eight stations have experimented on distance, drills generally giving better results than hills. A fair deduction favors rows thirty inches apart, and small seed-pieces twelve inches, quarters eighteen, halves twenty-four, and whole seed thirty inches apart in the row.

Alabama, Kansas and Utah stations favor level culture, while the Indiana station favors ridging, and Maryland, New York and Ohio find no difference. The general tendency is towards thorough preparation of soil and shallow, level culture. In dry countries and dry seasons mulching pays well; otherwise it is injurious. In fickle climates,mulch half the crop.

The best fertilizer depends on the deficiency of the soil. Generally, commercial fertilizers are preferred to barnyard manure for potatoes.

Rolling seed in flour of sulphur or soaking an hour in 15 gallons of water in which $2\frac{1}{2}$ ounces of corrosive sublimate has been dissolved, prevents scab. Sublimate corrodes metal and is a rank poison, hence, mix in a barrel and be careful. Spray the growing plants early and often with Bordeaux mixture containing Paris green, and neither bugs nor blight will trouble the crop.—[Farm, Field and Fireside.

Feeding Grown Fowls.

It is an impossibility for any one to say what quantity another person should feed his fowls for the best results. There are so many conditions to be met we can only give an idea, and the owner, in the first place, always remembers that a variety of food is the main point. Secondly, fowls given free range do not consume the amount of feed that those in close quarters do. Thirdly, different breeds require different amounts of feed. A good plan for the beginner is to weigh a certain amount of feed, then give to the fowls as much as they will eat clean, then weigh the remainder, and a fair idea can be learned, though even this plan is often deceptive, as fowls, like men, do not consume the same quantity at each meal.

Grown fowls should be fed twice daily, morning and evening. The morning feed should consist of a mixed food composed of corn meal, wheat-bran and middlings—two parts meal, one part bran, one part middlings—mixed with hot skimmed milk or boiling water. We always season with salt. Do not make it sloppy, but just so it sticks together well and feed just about one-half what they would eat, so they will exercise themselves for other food. In late summer we add to this about one-fourth the bulk in steamed clover, hay, green oats, or green corn fodder chopped fine. In winter, the former. During the early summer there is generally an abundance of grass and clover for the fowls to pick at their pleasure, yet it does no harm at any season of the year to add the above to the mixture.

For evening feed give all they will eat of whole or cracked corn, wheat or oats, but alternate these and feed very little corn in summer. Ground green-bone is superior to either of above evening feeds for egg production, and where a number of hens are kept, and the owner lives close to a meat mearket, it is economy to purchase a bone butter. In feeding fresh bone one must exercise judgment, says Bulletin No. 130, North Carolina Agricultural Experiment Station, for if the fowls once tire of it, it is with difficulty that they can be taught to eat it again. It should be alternated with above feeds. Bone is especially valuable during the moulting season. containing as it does nearly all the elements

needed for the growth of feathers, and for keeping up the vitality of the fowl.

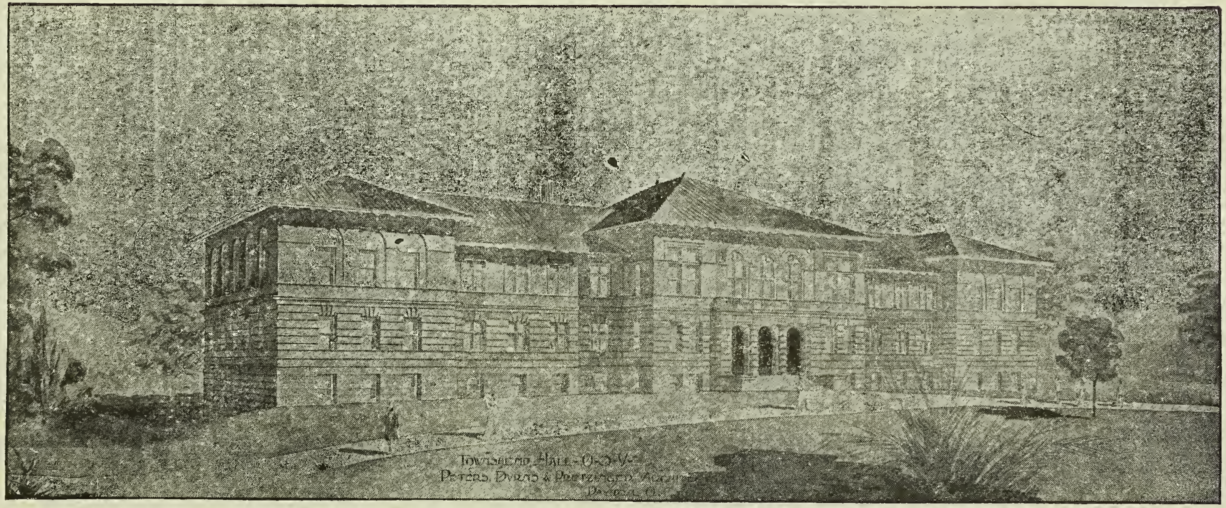
Old and young fowls should always have a liberal amount of clean, sharp grit before them, as it is to hens the same as teeth are to man. When fowls have free range where gravel is plentiful, there is no real necessity for supplying grit; but where there is nothing but fine sand, a small box full should be placed before each house. Crushed oyster shells and small pieces of charcoal are very beneficial, and it is surprising what a quantity of these ingredients they will consume. A fat hen lays few eggs, so one must remember not to overfeed.

Some Facts About Horse-Breeding.

Amid the reviews of the past and the predictions of the future common at the beginning of a new year it should be of value to note a fact or two bearing on the horse-breeding industry. Some weeks ago an advertisement appeared in our business columns calling for Percheron and coach stallions from two to seven years old and offering cash payment. A salable lot of horses was wanted; show horses were not asked for, but animals of good character were required for which cash prices would be paid. The advertisers were prepared to take twenty-five stallions of this character; they finally succeeded in getting three. More were offered, but many of them were either over or under the age specified. That advertisement reached a large percent of the men engaged in breeding Percherons and coachers; the meagreness of results indicates simply that stallions of serviceable age and salable condition are hardly to be found in this country. We have more than once noted the fact that stallioners, discouraged by the light patronage of their horses, have gelded them and sent them to market. This drain has now been going on for nearly five years and the result is beginning to be realized.

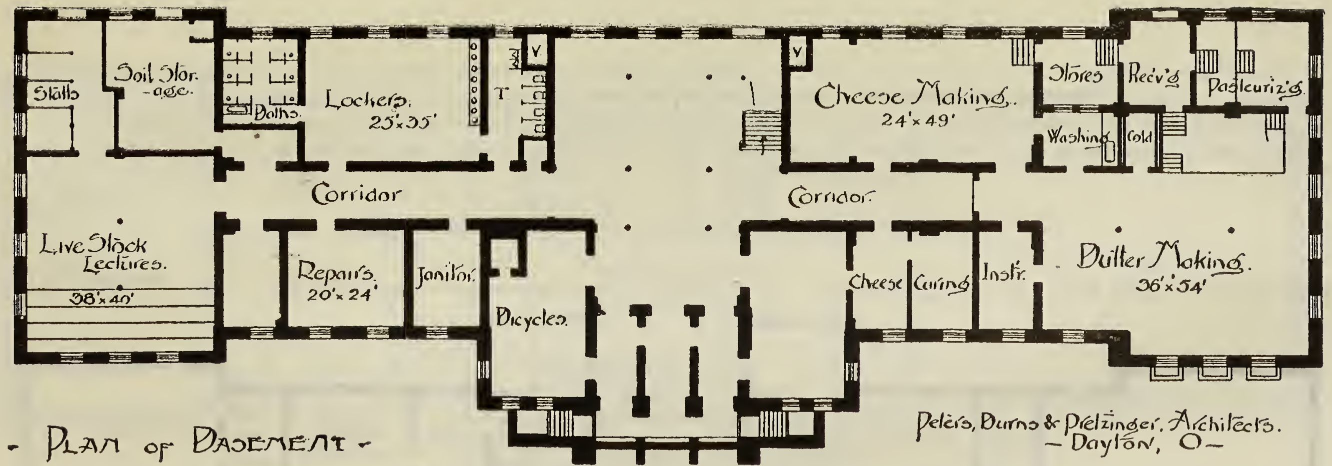
Some interesting information recently reached us from the draft-horse breeding districts in France from which it appears that it is useless to look to that country for any large number of stallions. The big dealers who formerly could supply horses by the hundreds now keep only six or eight, and not the least interesting part of this information is the fact that the young stallions which they have in their stables are held at as high prices as were paid in the "boom" importation times. When the demand from this country fell off farmers in France ceased horse-breeding and turned their attention to other lines, so that now the supply is so short that prices naturally are at a high level.

It is plain from these facts that when the demand does come again for stallions of this breed it cannot be supplied from France, but must be met from our own breeding studs. How many breeders have a realizing sense of this fact? How many have been preparing to meet it? Have good sires been used? Has care been bestowed on the young stock? Are the colts registered? This last point must not be overlooked. Penalty fees attach to long-delayed registrations in some stud books, so that it behooves breeders to avoid such extra tax. The man who fails to keep his pedigreed horses registered must certainly have lost all interest in breeding and have become careless of his investment. No one fact stands out more clearly in the history of stallion-selling in this country than that a stud-book certificate adds money value to a horse and helps his sale. Somewhat of a reawakening along this line has been noted of late; some breeders who have been careless of keeping up registration have been inquiring concerning penalty fees, sending for application blanks, and otherwise manifesting renewed interest in this important matter. It is well that they should. The issuance of volumes of these registers has been long delayed on account of lack of patronage, but it is to be hoped that the evident dearth of breeding stock and the almost certain return to breeding will stimulate interest in stud-book registration.—[Breeders' Gazette.



TOWNSHEND HALL.

The foundations are now being laid for Townshend Hall, the agricultural building which is located at the west end of the campus. This building will be 260 feet long, and varies in width from 64 to 78 feet. The walls above the basement line will be of gray pressed brick. The basement walls will be of Bedford stone and the trimmings will be of terra cotta of same color as the brick. The roof will be covered with cherry-red tile. The building will be of slow burning construction throughout, with painted interior, brick walls, exposed beams, maple floors, and oak and hard pine finish. The contract for its erection has been awarded the Columbus Construction Company at about $70,000. This building will bear the name of the late Dr. N. S. Townshend as a memorial of his public services and his work in advancing the cause of agricultural education.

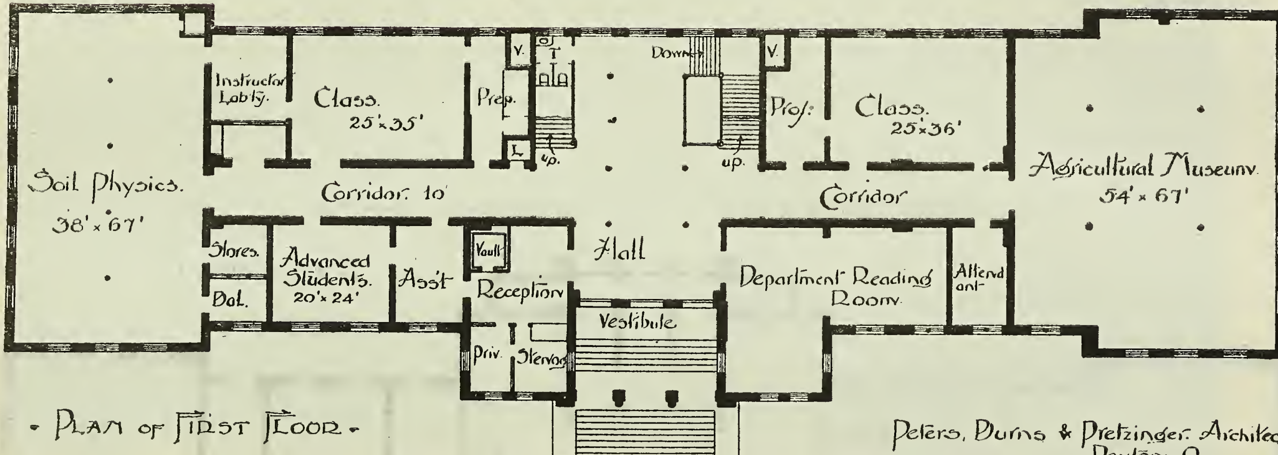


- PLAN OF BASEMENT -

TOWNSHEND HALL - OHIO STATE UNIVERSITY -

The basement, which is fifteen feet high, is entirely above ground on rear side of building, and is amply lighted from all sides. In the north half is located the dairy department, with rooms for testing and pasteurizing milk and for butter and cheese making. These rooms will be wainscoted with enamel brick and floors will be laid with tile, and will be equipped with the latest improved machinery and apparatus. An adjacent building, 16 x 30 feet, contains boiler and engine for operating this department.

At the south end of basement are apartments for the accommodation of live stock, while lecturing upon or judging them. Adjacent to, but detached from the soil storage room, is a glass house, 30 by 40 feet, for the experimental study of soils and farm crops.

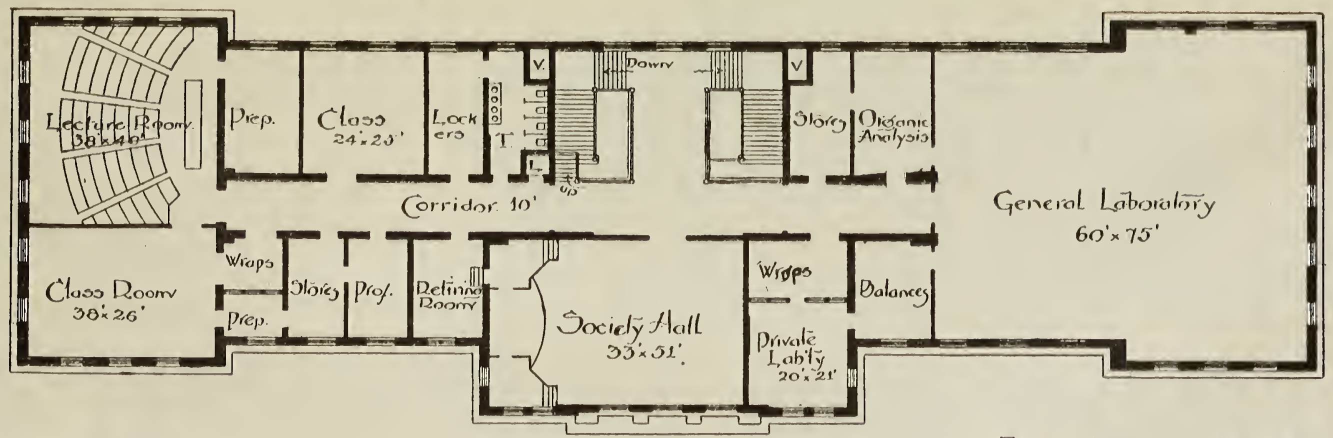


• PLAN OF FIRST FLOOR •

Peters, Burns & Pretzinger Architects.
~ Dayton, O. ~

• TOWNSHEND HALL • . OHIO STATE UNIVERSITY •

This floor contains the offices, class rooms, laboratories, reading room, library and museum of the Department of Agriculture. The museum will contain not merely specimens of farm products and samples of agricultural implements, but an attempt will be made to show the development of both Ohio and American agriculture and the industries intimately connected therewith. Materials or specimens which will aid to this end will be gladly received.



Peters, Burns & Pretzinger, Architects.
– Dayton, O. –

– PLAN OF SECOND FLOOR –

– TOWNSHEND HALL – OHIO STATE UNIVERSITY –

This floor contains the office, library, laboratories and class room of the Department of Agricultural Chemistry. The main laboratory is 65 by 75 feet, and will accommodate 100 students at one time. The lecture room will seat 160 persons. A society hall for the Townshend Society seats about 200 persons. Connected with this hall is an office for the editors of the AGRICULTURAL STUDENT. In the southeast part of this floor is a suite of rooms for the Department of Veterinary Medicine.

The Board of Trade a Necessity and Benefit to Farmers.

We believe that the Chicago Board of Trade, its objects and its benefits, are not so fully comprehended by the business world as could be wished; particularly among the very class that should make it their continual study, since they are more intimately concerned than any other. We refer to the farming community. They have been led to regard the board of trade as a gigantic gambling institution and nothing more. That there has been too much of it, we admit, but it has been and is the policy of the Board of Trade to eliminate and prohibit as near as possible, the gambling features of it. Whatever the evils may be as the Board of Trade is now constituted, it is an indispensable institution as an agency and a means in meeting the supply and demand between the producer and consumer of the products of the farm.

To protect every one concerned, the Board of Trade in its rules provides for deposits to secure the fulfillment of time contracts as follows: As protection to purchasers, that they shall have the right to require of sellers, as security, a deposit of ten percent. based upon the contract price of the property bought, and further securtiy from time to time, to the extent of any advance in the market value above said price. While for the protection of sellers, they have the right to require as security from buyers a deposit of ten per cent. on contract price of the property sold, and in addition, any difference that may exist or occur between the estimated legitimate value of any such property, and the price of sale. The same conditions would govern similar transactions between the farmer and his Chicago representative.

We wish it were possible for you to make this plain to the 3,000,000 farmers throughout the northwest, and if they could have confidence in their ability to do their own business as the grain buyers have been in the habit of doing it for them, they could add hundreds of millions of dollars annually to the wealth of the producers of this country.

We do not wish to be understood as favoring the practice of speculation, pure and simple. It is possible, for a man, with a speculative turn of mind, to take advantage of the facilities afforded by the Board of Trade to buy or sell on a 5 percent or 10 percent. margin, regardless of use or ownership of any and think he is doing business. Should his judgment prove wrong, he blames the institution through which he hoped to make a fortune, when in fact, he has no one but himself to blame. We do not approve of that kind of trading, but we do feel that farmers can take advantage of the conditions existing on the Board of Trade, and dispose of their grain for future delivery, same being just as legitimate a transaction as for them to sell their grain today to their home buyer agreeing to deliver it to him tomorrow, next week, or next month. But, for a person to expect to make a fortune on a small investment he is very often doomed to disappointment, because he must know that where there are prospects for large profits on a small investment, there must be corresponding risks of loss, and if he is not prepared or willing to take such risks he should not hope or expect to make the gains. This party, of course, should never speculate, but if he does and loses, he should not complain as he never gets any sympathy. Neither should the whole Board of Trade be condemned, because a few disgruntled speculators are disappointed in their attempts to forecall the market, any more than all of the churches should be condemned because a few bad men get in and use them for the furtherance of their own unholy purposes and desires.

Respectfully,

H. H. CARR & CO.,
The Farmer Commission House
94 Board of Trade Building,
Chicago.